

NASA-USDA Global Soil Moisture Data

The NASA-USDA Global soil moisture data provides soil moisture information across the globe at 0.25°x0.25° spatial resolution. This data set includes: surface and subsurface soil moisture (mm), soil moisture profile (%), surface and subsurface soil moisture anomalies (-). The data set is generated by integrating satellite-derived Soil Moisture Ocean Salinity (SMOS) Level 2 soil moisture observations into the modified two-layer Palmer model using a 1-D Ensemble Kalman Filter (EnKF) data assimilation approach. Soil moisture anomalies were computed from the climatology of the day of interest. The climatology were estimated based on the full data record of the SMOS satellite observation and the 31 day centered moving window approach. The assimilation of the SMOS soil moisture observations help improve the model-based soil moisture predictions particularly over poorly instrumented areas of the world that lack good quality precipitation data. This dataset was developed by the Hydrological Science Laboratory at NASA's Goddard Space Flight Center in cooperation with USDA Foreign Agricultural Services and USDA Hydrology and Remote Sensing Lab.

Data Availability:

01 January 2010 – present, 3-days composites

Spatial coverage:

180°W – 180°E, 60°N-60°S

Ftp/http Directory Organization:

Data link: <ftp://gimms.gsfc.nasa.gov/SMOS/jbolten/FAS/>,
<https://gimms.gsfc.nasa.gov/SMOS/jbolten/FAS/>

Sub-directory /L03:

Product: Surface and Subsurface soil moisture

File Naming Convention:

Surface soil moisture : <start date>_<end date>.as1.grib

Subsurface soil moisture : <start date>_<end date>.as2.grib

Start and end date format is YYYYMMDD.

Examples:

File name for 3-day composites surface soil moisture for the start date of January 1, 2018 and end date of January 3, 2018 is “20180101_20180103.as1.grib”

File name for 3-day composites subsurface soil moisture for the start date of January 1, 2018 and end date of January 3, 2018 is “20180101_20180103.as2.grib”

Sub-directory /L04

Product: Soil moisture profile

File Naming Convention:

Soil moisture profile: <start date>_<end date>.smp.grib

Start and end date format is YYYYMMDD

Example:

File name for 3-day composites soil moisture profile for the start date of January 1, 2018 and end date of January 3, 2018 is “20180101_20180103.smp.grib”

Sub-directory /L05

Product: Surface and Subsurface soil moisture anomaly

File Naming Convention:

Surface soil moisture anomaly : <start date>_<end date>._anom1.grib

Sub surface soil moisture anomaly : <start date>_<end date>._anom2.grib

Start and end date format is YYYYMMDD

Examples:

File name for 3-day composites surface soil moisture anomaly for the start date of January 1, 2018 and end date of January 3, 2018 is “20180101_20180103_anom1.grib”

File name for 3-day composites subsurface soil moisture anomaly for the start date of January 1, 2018 and end date of January 3, 2018 is “20180101_20180103_anom2.grib”

Product units:

Description	units
Surface soil moisture	mm
Subsurface soil moisture	mm
Soil moisture profile	(%)
Surface soil moisture anomaly	-
Subsurface soil moisture anomaly	-

File Format:

NASA-USDA Global Soil Moisture Data are in GRIdded Binary (GRIB) format.

Property	Value
Columns and Rows	1440,600
Pixel Size	0.25,0.25
Extent (Top, Left, Right, Bottom)	60,-180,180,-60

Provider:

NASA Goddard Space Flight Center, Greenbelt, MD.

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References:

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Bolten, J., and W. T. Crow (2012). Improved prediction of quasi-global vegetation conditions using remotely-sensed surface soil moisture, *Geophysical Research Letters*, 39: (L19406).

Bolten, J., W.T. Crow, X. Zhan, T.J. Jackson, and C.A. Reynolds (2010). Evaluating the Utility of Remotely Sensed Soil Moisture Retrievals for Operational Agricultural Drought Monitoring, *IEEE Transactions on Geoscience and Remote Sensing*, 3(1): 57-66.

Kerr, Y. H., and D. Levine (2008). Forward to the special issue on the Soil Moisture and Ocean Salinity (SMOS) mission, *IEEE Transactions on Geoscience and Remote Sensing*, 46(3): 583–585